



May 2009

# W715

---

Premium Walkman™ with Wi-Fi™



Sony Ericsson

# Preface

## Purpose of this document

---

This White paper will be published in several revisions as the phone is developed. Therefore, some of the headings and tables in this document contain limited information. Additional information and facts will be forthcoming in later revisions.

The aim of this White paper is to give the reader an understanding of the main functions and features of this phone.

People who can benefit from this document include:

- Operators
- Service providers
- Software developers
- Support engineers
- Application developers

This White paper is published by:

Sony Ericsson Mobile Communications AB,  
SE-221 88 Lund, Sweden

[www.sonyericsson.com](http://www.sonyericsson.com)

© Sony Ericsson Mobile Communications AB,  
2008. All rights reserved. You are hereby granted  
a licence to download and/or print a copy of this  
document.

Any rights not expressly granted herein are  
reserved.

First edition (May 2009)  
Publication number: 1224-8009 PA2

This document is published by Sony Ericsson Mobile Communications AB or its local affiliated company, without any warranty\*. Improvements and changes to this text necessitated by typographical errors, inaccuracies of current information or improvements to programs and/or equipment, may be made by Sony Ericsson Mobile Communications AB at any time and without notice. Such changes will, however, be incorporated into new editions of this document. Printed versions are to be regarded as temporary reference copies only.

\*All implied warranties, including without limitation the implied warranties of merchantability or fitness for a particular purpose, are excluded. In no event shall Sony Ericsson or its licensors be liable for incidental or consequential damages of any nature, including but not limited to lost profits or commercial loss, arising out of the use of the information in this document.

# Sony Ericsson Developer World

---

On [www.sonyericsson.com/developer](http://www.sonyericsson.com/developer), developers will find documentation and tools such as phone White papers, Developers guidelines for different technologies, SDKs and relevant APIs. The Web site also contains discussion forums monitored by the Sony Ericsson Developer Support team, an extensive Knowledge Base, Tips & Tricks, example code and news. Sony Ericsson also offers technical support services to professional developers. For more information about these professional services, go to the Sony Ericsson Developer World Web site.

## Document history

---

---

### Change history

2009-05-11		Final version - Revision 2
2009-02-05		Final version

# Contents

<b>Product overview .....</b>	<b>5</b>
Key features .....	5
Images .....	8
<b>Technologies in detail .....</b>	<b>9</b>
<b>Facts and figures .....</b>	<b>25</b>
Technical specifications .....	26
General technical data .....	26
Performance and technical characteristics .....	26
USSD technical data .....	28
GPRS technical data .....	28
SIM AT services supported .....	29
Entertainment .....	34
Audio and Video .....	34
Java™ .....	36
Imaging/Messaging .....	36
3.2 megapixel camera .....	36
Video telephony .....	38
Images .....	38
Supported character set .....	39
Short Messaging Service .....	39
Enhanced Messaging Service .....	41
Multimedia Messaging Service .....	42
Email client technical data .....	44
Connectivity .....	44
.....	44
A-GPS .....	45
A-GPS technical data .....	45
Bluetooth™ wireless technology technical data .....	45
WLAN technical data .....	46
GAN technical data .....	47
OMA Data Synchronization (SyncML™) technical data .....	47
Microsoft® Exchange ActiveSync® .....	48
Web browser technical data .....	48
Client Provisioning .....	52
<b>Abbreviations .....</b>	<b>54</b>
<b>Related information .....</b>	<b>58</b>
Documents .....	58
Links .....	58
Trademarks and acknowledgements .....	58

# Product overview

---

W715 is a sleek metal slider phone that radiates style with its premium finish and materials. Inside, it has everything you need for a powerful music experience. Shake control, the latest Walkman™ player and Wi-Fi™ (NOTE: Not available in China market) for fast and easy access to your online music libraries and stores. Being a premium Walkman™ phone, W715 has a host of features and applications designed for music. The Walkman™ music player controls are on the navigation key.

**NOTE:** The W715 variant available in the China market does not support Wi-Fi. Where relevant, the NOTE 'Not available in China market' will be present.

# Key features

---

## Walkman™ player 3.0

Located in Media, the Walkman® player converts the phone into a portable music player that supports AAC, AAC+, Enhanced ACC+, MP3, MP4, M4A, 3GP, AMR NB, WAV and WMA audio formats. Access audio books and podcasts you have transferred from your computer. Use SensMe™ to discover music by mood. The phone knows the mood of each song without having to enter information such as slow, fast, major, minor, acoustic, electric etc. Mark a song, a circle appears around this and encircles several other songs in the same mood creating a selection. There is no need to choose artist or album, just mood.

## Clear audio experience

This new audio technology combines three concepts that enhance your listening experience. Consisting of Clear stereo with left and right channels for reduced leakage, Clear bass for sharp, dynamic, distortionfree bass and a premium headset to ensure you enjoy the best audio quality available.

## Wi-Fi™ NOTE: Not available in China market

Access the Internet by connecting to Wi-Fi™ networks. Browse the Internet at home (personal networks) or in public access zones (hot spots). Standards supported are 802.11b and 802.11g.

## GPS (Global Positioning System)

With the GPS and location based services, such as preloaded Google Maps™ for mobile, and a free three-month trial version of Wayfinder Navigator™, you can know where you are and how to find your way. Use geo tagging to tag a photo with geographic data that shows, on a map, where the photo was taken.

## Shake control

Shake the phone to shuffle the playlist, jump to another song, or control gaming functions.

## Digital Living Network Alliance (DLNA™) NOTE: Not available in China market

The phone has a built-in DLNA™ server that connects to the home network through Wi-Fi™. Other DLNA devices connected to the same home network can access, view and play images and music saved on your phone. A compatible DLNA device can be a computer, TV or PLAYSTATION®3.

## Media

A unique Sony Ericsson media experience. All media can be accessed directly from the desktop. Navigate seamlessly through captured photos and video clips, pictures, photo tags, music, videos and more.

## TrackID™

TrackID™ enables the user to identify a track playing on the built-in radio, or a track playing in the room. A few seconds of the song is sampled, the phone connects to an online database, which identifies the song and returns title, artist and album information.

## 2.4-inch QVGA Screen

The large 2.4-inch (240x320 pixels) full graphic QVGA 262k colour screen enhances viewing, facilitating high-quality multimedia and entertainment.

### **3.2 megapixel camera**

The main camera is 3.2 megapixel and includes 3.2x digital zoom, Photo light, Auto rotate and Photo fix. All this means high quality photos. The Photo light can be used as video light when recording videos. The horizontal user interface allows for easier camera handling. A photo can be shared as a picture message, email message or blog with friends or family. Photos can also be transferred to another phone or computer using any available transfer method, such as Bluetooth™ wireless technology or USB cable.

### **PlayNow™ 5.0**

A unique and easy-to-use direct-link for downloading ringtones, full track music, games, themes and wallpapers. PlayNow™ offers best-selling content for mobile download. Users can preview content before purchase. Users have access to a catalogue of millions of tracks from both international and local labels.

By combining the PlayNow™ catalogue with unique applications like TrackID™ users are presented with a My TrackID™ list and TrackID™ Charts by country, created by TrackID™ users around the world. These charts are based on what songs other users are searching for and want to hear the most. PlayNow™ supports MP3 and Windows Media DRM file formats for music.

### **Bluetooth™ audio streaming**

Listen to audio in compatible devices. By connecting a Bluetooth Advanced Audio Distribution Profile (A2DP) compatible accessory, such as a stereo Bluetooth headset or a Bluetooth music receiver, you can enjoy high quality stereo audio streaming wirelessly from the phone. Many A2DP accessories also support the Bluetooth Audio Video Remote Control Profile (AVRCP) allowing you to control the player in the phone using the accessory interface.

# Images

---





# **Technologies in detail**

---

This chapter includes short descriptions of the technologies available in this product compared to the Sony Ericsson W980.

Feature	W715
<b>3D games</b>	Yes
<b>3G enabled</b>	Yes
<b>Activity menu (multi-tasking)</b>  The user can easily handle missed calls, new text and picture messages, task reminders, shortcuts and get quick access to favourite Internet bookmarks	Yes with enhanced functionality for background applications
<b>Alarm clock</b>  Set up to five individual times for single or recurring weekly alarms	Yes
<b>Auto rotate</b>  The photo appears as a landscape or portrait photo, as it was originally taken	Yes
<b>Backlight</b>  White backlight to illuminate the phone screen	Yes
<b>Battery</b>	BST-33 3.6 V, 1000 mAh, Lithium Polymer
<b>Battery charging time</b>	At least 90% charged within 2 hours. Fully charged within 2.5 hours Note: for China market At least 90% charged within 3 hours. Fully charged within 3.7 hours.
<b>BestPic™</b>  Enhance photo taking by automatically capturing a range of 7 photos ranging from before to after a camera key press. Select the best photo to catch the moment. You can also save more than one photo.  Select BestPic™ speed BestPic™ with light	No       No No

<b>Feature</b>	<b>W715</b>
<b>Bluetooth™ audio streaming</b>  Listen to audio in compatible devices	Yes
<b>Bluetooth™ audio video remote control</b>  Control music player functions from a Bluetooth™ accessory, and control the volume in the accessory from the phone	Yes
<b>Bluetooth™ PAN</b>  Connect the phone to Internet using Bluetooth™ wireless technology	Yes
<b>Bluetooth™ wireless technology</b>  Wireless connectivity between devices within a range of up to 10 metres (33 feet). Support for specification of the Bluetooth System, version 2.0 and EDR	Yes
<b>Business card exchange</b>  Exchange contact information	Yes
<b>Buy Now</b>  Mark a track if you are interested in buying it later. Option to buy the track when synchronising with Microsoft® Windows Media® Player. The Buy Now service requires a subscription and account with a downloadable music service, a computer with Microsoft® Windows Media® Player 11 or subsequent compatible version of Windows Media® Player, and a USB computer connection	Yes
<b>Calculator</b>	Yes
<b>Calendar</b>  Calendar with day, week and month views and reminders	Yes
<b>Call list</b>  View calls made and received	Yes
<b>Camera</b>	3.2 megapixel
<b>Camera file browser</b>  Browse the photo folder without leaving the camera function	Yes

Feature	W715
<b>Camera key</b>  A dedicated camera key	Yes
<b>Camera menu</b>  Easy-to-use horizontal digital camera menu	Yes
<b>Camera settings bar</b>  Settings bar with options and info texts	Yes
<b>Chinese input method</b>  Chinese input methods: Text input methods based on Simplified or Traditional Chinese. Bopomofo, Pinyin or Stroke	Yes
<b>Clear audio experience</b>  Combines three concepts that enhance your listening experience: Clear stereo with left and right channels for reduced leakage, Clear bass for sharp, dynamic, distortion-free bass and a premium headset.	Yes
<b>Co-branding area</b>	38.4 × 6.85 mm
<b>Code memo</b>  A safe place to save all PIN codes and other information. To access Code memo, only one PIN code is needed	Yes
<b>Colour</b>	Luxury Silver Garnet Black Galactic black
<b>Contact photos</b>  Add a photo to a saved contact. The picture appears on the screen when the saved contact calls	Yes
<b>Contacts</b>  Phonebook with fields for name, phone, fax and instant messaging information, presence information, email address, Web site, title, company address info, personal address info and birthday	Yes
<b>Conference calls</b>  Support for multiparty calling	Yes
<b>Connector A1 (Fast port)</b>	Yes (side)

Feature	W715
<b>Content online</b>  Downloadable pictures, games, themes, ringtones available online	Yes
<b>Copyright protection</b>  DRM (Digital Rights Management) features the rights and copy protection of downloaded content (audio, pictures, music tones, video clips and entertainment features such as games, Java applications etc.)	Yes, OMA DRM 1.0, 2.0 and 2.1, Microsoft DRM Janus
<b>Device Management (DM)</b>  DM utilises GPRS as a bearer (basic network connectivity needs to be in place) of the provisioning data and allows the operator to access the phone, check and send out different settings such as network connectivity (GPRS), email, MMS, Internet settings and Java™. Device Management is achieved by supporting OMA Client Provisioning 1.1 (CP) and OMA Device Management (DM) 1.2	Yes
<b>Digital zoom</b>	3.2x for Picture (VGA mode) 3.2x for video clips 2.0x for video calls(front camera) 3.0x for video calls(main camera)
<b>Digital Living Network Alliance (DLNA™)</b>  Built-in DLNA™ server that connects to the home network.	Yes
<b>Email</b>  Built-in email client with inbox, outbox, compose/send and other functions	Yes
<b>EMS (Enhanced messaging)</b>  Text messaging (SMS) with support for pictures and sounds  Note: EMS is not available for operators who use unified messaging	Yes
<b>Exterior description</b>  Size mm (Length x width x thickness/thinnest)	95 x 47.5 x 14.3(mm)

Feature	W715
<b>External antenna connector</b>  For use with an advanced car handsfree accessory	No
<b>Fast port</b>  A system connector which enables faster data transfer between the phone and a computer	Yes
<b>File manager</b>  Folder structure storage to help save and organise pictures, sounds and other phone content	Yes, with enhanced functionality for camera content
<b>Flash themes</b>	Yes
<b>Flight mode</b>  All phone radio transceivers are inactivated. Flight mode starts the phone so that only certain functions are available, such as the calendar, the music player or a game. The phone may then be used in some areas, such as aeroplanes or hospitals, where full mobile phone functionality is not allowed.  Wi-Fi™ function availability in Flight mode	Yes  Note: Not available in China market
<b>FM radio with RDS</b>  FM radio with presets, auto and manual search. The handsfree is used as an antenna. The radio can also be used as an alarm signal	Yes, 100 kHz tuning interval
<b>FM radio with TrackID™</b>  Identify tracks playing on the radio	Yes
<b>Form factor</b>	Slider
<b>Games download</b>  Add more games to your phone	Yes
<b>Games embedded</b>	Yes
<b>Geo tagging</b>  Photos are tagged with geo data and can be shown on a map	Yes

Feature	W715
<b>Google Maps™ for mobile</b>  Preloaded application with support for cell-id. View satellite imagery, find locations and calculate routes	Yes
<b>GPRS</b>  General Packet Radio Services – a communications standard enabling packet data transfer of 21.4 Kbps per time slot. Multislot class 10 supported (max 5 simultaneously)	Yes
<b>High Speed Data</b>  HSPA – High Speed Packet Access	Yes
<b>Icon Desktop 12</b>  A graphic icon desktop with 12 interactive icons	Yes
<b>Image formats</b>  <b>3.2 MP</b> (2048x1536 pixels)  <b>2 MP</b> (1632x1224 pixels)  <b>1 MP</b> (1280x960 pixels)  <b>VGA</b> (640x480 pixels)	Yes  Yes  Yes  Yes
<b>Instant messaging (Wireless Village™)</b>  Chat – several people can take part in a mobile messaging session. Instant messaging/Wireless Village server community	Yes
<b>Internet blogging</b>  Share over the Internet on your personal Web site. The size of uploaded photos is dependent on customizations	Yes

Feature	W715
<b>Internet browser</b>	Yes
Full HTML support, ECMA script, DOM level 1&2, CSS 1&2 etc.	Yes
Support for AJAX (Asynchronous JavaScript and XML)	Yes
Progressive download of video files.	Yes
Direct access to Bookmarks, Search Internet and Enter address	Yes
Mouse Pointer	Yes
Text Wrapping	Yes
Pan&Zoom	Yes
<b>Internet security</b>	Yes, SSL/TLS
Encrypts confidential information such as credit card and bank account numbers. Necessary for mobile banking and shopping	
<b>Java™</b>	Java 2, Micro Edition (J2ME™), Java 3D™ JP-8.4
Support for J2ME™ technology	
Sony Ericsson Java Platform	
Support for new Java programming features including banking, payment transactions, user identification and authentication through secure encryption technology.	Yes
<b>Keys – navigation and more</b>	4 navigation keys
	3 selection keys
	C (Clear) key
	Activity menu key
	End and on/off key
	Call key



Feature	W715
<b>Keys – keypad</b>	12 alphanumeric
<b>Keys – side and other</b>	Volume/ camera zoom key Walkman™ key Camera key
<b>Lunar calendar</b>  A calendar system used in China and other parts of Asia. A lunar month is determined by the period required for the moon to complete its full cycle of 29.5 days and is available in Chinese phone variants	Yes
<b>Adobe™ Flash Lite™</b>  For animated wallpapers, menus and other graphic elements	Yes
<b>Media</b>  A centre for all media content with horizontal and vertical navigation. You can view photos, listen to music, watch video clips	Yes
<b>Media player</b>	See Walkman™ player and Video player
<b>Memory (built-in)</b>  Phone memory that is free to use (depending on software configuration and file content). Many applications share phone memory. The maximum amount of storage available for any one application, such as calendar entries, is affected by the amount of memory used by other applications, such as messaging, music, photos and so on	Up to 80 MB

Feature	W715
<b>Memory card reader (slot)</b>	
A slot for inserting a micro peripheral storage device	Yes
Memory card support: Memory Stick Micro™ (M2™) SanDisk microSD™/Transflash™	Yes No
<b>Menu layout options</b>	Yes
Possibility to change the layout of the icons in the main menu	
<b>Menu shortcuts</b>	Yes
A function making it possible to dedicate shortcuts to the most-used phone functions	
<b>MMS (Multimedia messaging)</b>	Yes
Picture messaging with text and sound	
<b>MMS video</b>	Yes
Support in the phone for sending video clips using MMS	
<b>Modem</b>	Yes
Circuit Switched/Packet Switched Internet dial-up support	
<b>MusicDJ™</b>	Yes
A music composer tool with MIDI drum, guitar, keyboard, bass and brass loops in different music styles, which can be combined to create polyphonic ringtones	
<b>Music listening time</b>	Up to 20 hours
<b>Music tones</b>	Yes
Music tones, also called master tones, are DRM protected music by original artists. Various digital audio formats are supported	
<b>My time zone</b>	Yes
Select the time zone manually by country or city	

Feature	W715
<b>Networks</b>	
3G/HSPA	UMTS/HSPA 900, 2100
GSM/GPRS/EDGE	GSM (R99) 850, 900, 1800, 1900, E-GSM 900
<b>Notes</b>	Yes
Make notes of things to remember. A note can be shown in standby	
<b>OMA Data Synchronization (SyncML)</b>	Yes
A device communications standard that enables remote synchronization between devices	OMA DS 1.2 OMA DS 1.1.2
<b>OTA settings</b>	Yes
Internet, email and other settings can be sent over the air to the phone	OMA CP 1.1
<b>Photo light (built-in)</b>	Yes
When lighting conditions are poor, activate the picture light	
<b>PhotoDJ™</b>	Yes
A drawing tool in the phone where existing photos can be altered	
<b>Photo fix</b>	Yes
Improves an under-exposed photo by calculating and adjusting the light balance	
<b>PictBridge™</b>	Yes
Transfer images from the phone via the USB cable directly to a printer, without a computer or photo editing software	

Feature	W715
<b>Picture gallery</b>	Yes
A thumbnail image gallery where sections of several photos can be viewed at the same time	Use photo tags
<b>PlayNow™ (direct link)</b>	Yes
Listen to music before you purchase and download it to your phone	
<b>PlayNow™ Games (direct link)</b>	Yes
Download and purchase games straight from the phone desktop	
<b>Polyphonic voices</b>	72
<b>Powersave</b>	Yes
default setting for display light	
<b>Predictive text input</b>	Yes
<b>Push email</b>	Yes
<b>RSS reader</b>	See Web feeds
<b>Screen</b>	
Type:	Full graphical
Size:	2.4 inches
Resolution:	240x320 pixels
Technology:	TFT, QVGA
Colours displayed together:	262,000 (18 bit)
Backlight colour:	White
<b>Screen saver</b>	Yes
<b>SensMe™</b>	Yes
Sort music tracks by mood	
<b>Settings download (Ready to run)</b>	Yes
Set up functions that require a connection to the Internet such as the Internet browser and picture messaging. This function runs in the setup wizard or can also be chosen in the Settings menu. This function is not included in the setup wizard for customised phones	
<b>Shake control</b>	Yes
Shake control for music and gaming	

Feature	W715
<b>SIM card lock</b>  The possibility to protect the SIM card with a four-digit to eight-digit PIN code	Yes
<b>Smart search</b>  Search for numbers and contacts from standby by using the number keys. Smart filter and smart search by names in contacts list by entering some keys. Call or send messages from a filtered list of search results.	Yes
<b>SMS long (Text messaging)</b>  Concatenated SMS text messaging	Yes
<b>Sleep mode</b>  A power-saving feature that minimises the battery power consumed when the phone is in standby	Yes
<b>Sony Ericsson Remote Update Service</b>  Download the latest software over the air	Yes
<b>Sony Ericsson Update Service</b>  Connect the phone to an Internet-connected computer, download the latest software from the Web site, <a href="http://www.sonyericsson.com/support">www.sonyericsson.com/support</a> and update the mobile device	Yes
<b>Sony Ericsson Update Service Pro</b>  Update the phone with the latest software at your local Sony Ericsson retailer	Yes
<b>Sound recorder</b>  A recording device in the phone that can record voice messages or other sounds	Yes
<b>Speakerphone</b>	Yes
<b>Speed dialling</b>  Allocate contacts in the phone book to specific keys on the keypad	Yes
<b>Standby time</b>  GSM UMTS	Up to:  400 hours 350 hours

<b>Feature</b>	<b>W715</b>
<b>Status view</b>  The screen shows the network being used, the time and other status information	Yes
<b>Stopwatch</b>	Yes
<b>SVG Tiny</b>  Scalable Vector Graphics for impressive animated wallpapers, menus and other graphic elements	Yes
<b>Synchronization PC</b>  Synchronise and share phone content with a computer	Yes
<b>Talk time</b>  GSM UMTS	Up to:  10 hours 4hours
<b>Tasks</b>  Keeps track of important things you have to do	Yes
<b>Themes</b>  Phone menu texts and background graphics	Yes
<b>Timer</b>  Set the phone to alert after a specific time	Yes
<b>TrackID™</b>  Music recognition  Text search for artist, album, track, lyrics etc.	Yes  Yes
<b>UMTS</b>	Yes
<b>USB connectivity support</b>  Connect the phone to a computer using the USB cable provided	Yes  USB 2.0 Hi-Speed
<b>USB ethernet emulation</b>  Connect to the Internet using the phone or the computer	Yes

Feature	W715
<b>Vibrating alert</b>  The phone vibrates when a call comes in	Yes
<b>Video blogging</b>  Share video clips over the Internet on your personal Web site. The size of uploaded video clips is dependent on customizations	Yes
<b>Video call camera</b>	Yes
<b>Video call talk time</b>	Up to 3 hours 30 mins
<b>VideoDJ™</b>  Create video sequences by combining different clips and adding music and images	Yes
<b>Video player</b>  Play video clips you have transferred or downloaded. Transfer video clips to another phone or a computer using an available transfer method	Yes
<b>Video streaming</b>  Real-time streaming of video clips, for example, live cam. Media can also be downloaded and saved in the phone memory	Yes
<b>Video telephony</b>  When you make a video call, the other party can be seen on the screen. The service requires UMTS/ WCDMA	Yes
<b>Viewfinder</b>  When using the camera, a photo can be previewed before it is captured	Yes
<b>Voice control</b>  Voice answer, reject and call. Assign voice commands to items in the phonebook. When a call is made, the voice command can be used instead of pressing keys	Yes
<b>Voicemail</b>  Support for voicemail operator service including automatic answering and message recording	Yes

Feature	W715
<b>Walkman™ player 3.0</b>  A digital music player with horizontal navigation. Play music you have transferred or downloaded. The list structure system enables you, for example, to organise favourite songs into groups and create various playlists	Yes
<b>Web feeds</b>  Frequently updated content delivered as feeds via a Web site, for example, news headlines in the browser	Yes
<b>Web feeds ticker</b>  View news headers in standby	Yes
<b>Weight</b>	98 g
<b>Wi-Fi™ NOTE: Not available in China market</b>  Connect the phone to the digital home network or Internet using Wi-Fi™ 802.11b or 802.11g	Yes



# Facts and figures

---

This chapter offers readers a detailed listing of all the technical data relating to the product. Comprehensive descriptions of performance and technical characteristics are presented in table format for quick and easy access.

# Technical specifications

## General technical data

System	Quad-band GSM Release 5 recommendations, GSM 850, GSM 900, e-GSM 900, GSM 1800, GSM 1900. UMTS/HSPA 900, 2100 supported,
Speech coding	HR, FR, EFR, AMR, supported where available, for high speech quality.
GSM SIM/ UMTS USIM/SIM card	GSM SIM - 3GPP TS 51.011; UMTS USIM - 3GPP TS 31.102; UMTS ISIM - 3GPP TS 31.103. Small plug-in card, 1.8 V and 3 V.
Memory	Up to 80 MB internal (depending on software configuration/file content) plus extra slot for supported memory cards.
Data transfer speeds	Up to 7.2 Mbps (downlink, HSDPA, cat 8) Up to 2.0 Mbps (uplink, HSUPA, cat 5)

## Performance and technical characteristics

Property	GSM 850	GSM 900
Frequency range (MHz)	TX:824-849 RX:869-894	TX:880-915 RX:925-960
Channel spacing	5 MHz with 200 kHz channel rasters	5 MHz with 200 kHz channel rasters
Number of channels	102	152
Modulation	QPSK (WCDMA R99) QPSK/16 QAM (HSDPA)	QPSK (WCDMA R99) QPSK/16 QAM (HSDPA)
TTI	10 ms (WCDMA R99) 2 ms (HSDPA)	10 ms (WCDMA R99) 2 ms (HSDPA)
TX phase accuracy	Error Vector Magnitude: <17.5%	Error Vector Magnitude: <17.5%
Duplex spacing	45 MHz	45 MHz
Frequency stability	Frequency stability +/-0.1 ppm	Frequency stability +/-0.1 ppm
Voltage operation (nominal)	3.6 V	3.6 V
Transmitter RF power output	24 dBm Class 3 (0.25 W peak)	24 dBm Class 3 (0.25 W peak)
Transmitter Output impedance	50 ohm	50 ohm

Property	GSM 850	GSM 900
Transmitter spurious emission (according to specification)	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to 3GPP™spec.)	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to 3GPP™spec.)
Receiver RF sensitivity	Better than -104.7 dBm @ 12.2 kbps CS voice	Better than -103.7 dBm @ 12.2 kbps CS voice
Receiver RX bit error rate	< 0.1%	< 0.1%

  

Property	WCDMA 1900	WCDMA 2100
Frequency range (MHz)	TX:880-915 RX:925-960	TX: 1920-1980 RX: 2110-2170
Channel spacing	5 MHz with 200 kHz channel rasters	5 MHz with 200 kHz channel rasters
Number of channels	152	277
Modulation	QPSK (WCDMA R99) QPSK/16 QAM (HSDPA)	QPSK (WCDMA R99) QPSK/16 QAM (HSDPA)
TTI	10 ms (WCDMA R99) 2 ms (HSDPA)	10 ms (WCDMA R99) 2 ms (HSDPA)
TX phase accuracy	Error Vector Magnitude: <17.5%	Error Vector Magnitude: <17.5%
Duplex spacing	45 MHz	190 MHz
Frequency stability	Frequency stability +/- 0.1 ppm	+/-0.1 ppm
Voltage operation (nominal)	3.6 V	3.6 V
Transmitter RF power output	24 dBm Class 3 (0.25 W peak)	24 dBm Class 3 (0.25 W peak)
Transmitter Output impedance	50 ohm	50 ohm
Transmitter spurious emission (according to specification)	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to 3GPP™spec.)	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to 3GPP™spec.)
Receiver RF sensitivity	Better than -104.7 dBm @ 12.2 kbps CS voice	Better than -106.7 dBm @ 12.2 kbps CS voice
Receiver RX bit error rate	< 0.1%	< 0.1%

## USSD technical data

Feature	Support
USSD support	GSM Phase 1/2 (cross-phase compatibility)
Mode support	<ul style="list-style-type: none"> <li>• UI-mode supported</li> <li>• SAT initiated USSD supported</li> </ul>
UI-mode details	<ul style="list-style-type: none"> <li>• It is possible to scroll the text up and down in USSD messages</li> <li>• It is possible to highlight embedded numbers and take actions accordingly</li> </ul>

## GPRS technical data

Property	Support
Compatible GPRS/EDGE and SMG specifications	Release 99 according to ETSI specification
Data rates GPRS (per time slot)	Coding scheme CS-1: 9 Kbps CS-2: 13,4 Kbps CS-3: 15,6 Kbps CS-4: 21,4 Kbps (network-dependent).
Data rates EDGE (per time slot)	Modulation & coding scheme (MCS) MCS-1 (GMSK): 8.0 Kbps MCS-2 (GMSK): 11.4 Kbps MCS-3 (GMSK): 14.8 Kbps MCS-4 (GMSK): 17.6 Kbps MCS-5 (8-PSK): 22.4 Kbps MCS-6 (8-PSK): 29.4 Kbps MCS-7 (8-PSK): 44.8 Kbps MCS-8 (8-PSK): 54.4 Kbps MCS-9 (8-PSK): 59.2 Kbps
Medium Access Modes	Dynamic allocation
Support of Packet Control Channels (PBCCH/PCCCH)	Yes
Network operation mode	NOM I, II, III
Support of GPRS/CS combined procedures	Yes
Network control mode	NC0 and NC2
Support of access in 2 phases	Yes
Support of PRACH on 11 bits	Yes
Support of GPRS re-selection C31/C32	Yes

Property	Support
Support of static and dynamic addressing	Yes
Support of power control uplink and downlink	Uplink = yes, downlink is a network feature
Support of ciphering algorithms	GEA1, GEA2
Support of compression algorithms	Yes, V42bis and IP header compression
Mode of operation	Class B and Class C modes of operation supported
R Reference point	<ul style="list-style-type: none"> <li>Physical layer: Support of RS232</li> <li>PPP is supported as L2 layer in the R reference point</li> <li>Authentication algorithms PAP, CHAP supported</li> </ul>
IP connectivity	<ul style="list-style-type: none"> <li>PDP type IP is supported</li> <li>IP termination in mobile or TE (laptop, PDA) is supported</li> </ul>
PDP context	<ul style="list-style-type: none"> <li>10 PDP context descriptions saved in the phone</li> <li>PDP context description is edited via application in the phone</li> <li>AT-command or via OTA</li> <li>Simultaneous PDP contexts are supported, maximum 4</li> </ul>
SIM	GPRS aware, as well as non-GPRS aware, SIM cards are supported
AT commands	<p>Some of the supported commands:</p> <p>AT+CGDCONT - DEFINE PDP CONTEXT</p> <p>AT+CGEQREQ - Quality of Service Profile (REQUESTED)</p> <p>AT+CGEQMIN - Quality of Service Profile (Minimum Acceptable)</p> <p>AT+CGATT - PACKET DOMAIN SERVICE ATTACH OR DETACH</p> <p>AT+CGACT - PDP CONTEXT ACTIVATE OR DEACTIVATE</p> <p>AT+CGDATA - ENTER DATA STATE</p> <p>For more information, see <a href="http://www.sonyericsson.com/developer">www.sonyericsson.com/developer</a></p>

## SIM AT services supported

Service	Mode	Support
CALL CONTROL BY SIM		Yes
MO SMS CONTROL		Yes
DATA DOWNLOAD TO SIM	Cell Broadcast	Yes
	SMS	Yes

Service	Mode	Support
DISPLAY TEXT	Text of up to 240 characters (120 UCS2 coded).	Yes
	bit 1: 0 = normal priority	Yes
	1 = high priority	Yes
	bit 8: 0 = clear message after a delay	Yes
	1 = wait for user to clear message	Yes
GET INKEY	General: The GET_INKEY requires that the user confirms his/her choice	Yes
	bit 1: 0 = digits (0-9, *, # and +) only	Yes
	1 = alphabet set	Yes
	bit 2: 0 = SMS default alphabet	Yes
	1 = UCS2 alphabet	Yes
	bit 3: 0 = character sets defined by bit 1 and bit 2 are enabled	Yes
	1 = character sets defined by bit 1 and bit 2 are disabled and the Yes/No response is requested	Yes
GET INPUT	General: No. of hidden input characters	252
	bit 1: 0 = digits (0-9, *, # and +) only	Yes
	1 = alphabet set	Yes
	bit 2: 0 = SMS default alphabet	Yes
	1 = UCS2 alphabet	Yes
	bit 3: 0 = ME may echo user input on the display	Yes
	1 = user input not to be revealed in any way (see note)	Yes
	bit 4: 0 = user input to be in unpacked format	Yes
	1 = user input to be in SMS packed format	Yes
	bit 8: 0 = no help information available	Yes
	1 = help information available	Yes
LAUNCH BROWSER		Yes
MORE TIME		Yes
PLAY TONE		Yes
POLLING OFF		Yes
POLL INTERVAL		Yes

Service	Mode	Support
PROVIDE LOCAL INFORMATION	'00' = Location Information (MCC, MNC, LAC and Cell Identity)	Yes
	'01' = IMEI of the ME	Yes
	'02' = Network Measurement results	Yes
	'03' = Date, time and time zone (DTTinPLI)	Yes
	'04' =Language setting	Yes
	'05' =Timing advance	Yes
REFRESH	General: The reset option requests the user to wait while the phone restarts	Yes
	'00' = (U)SIM Initialization and Full File Change Notification	Yes
	'01' = File Change Notification	Yes
	'02' = (U)SIM Initialization and File Change Notification	Yes
	'03' = (U)SIM Initialization	Yes
	'04' = (U)SIM Reset	Yes
	'05' = USIM Application Reset	Yes
	'06' = 3G Session Reset	Yes
SELECT ITEM		Yes
SEND DTMF		Yes
SEND SHORT MESSAGE	bit 1:	0 = packing not required
		1 = SMS packing by the ME required
SEND SS		Yes
SEND USSD		Yes

Service	Mode	Support
SET UP CALL	General: Capability configuration	Yes
	Set-up speech call CallParty Subaddress	No
	DTMF support	Yes
	'00' = set up call, but only if not currently busy on another call	Yes
	'01' = set up call, but only if not currently busy on another call, with re-dial	Yes
	'02' = set up call, putting all other calls (if any) on hold	Yes
	'03' = set up call, putting all other calls (if any) on hold, with re-dial	Yes
	'04' = set up call, disconnecting all other calls (if any)	Yes
	'05' = set up call, disconnecting all other calls (if any), with re-dial	Yes
SET UP EVENT LIST	'00' = MT call	Yes
	'01' = Call connected	Yes
	'02' = Call disconnected	Yes
	'03' = Location status	Yes
	'04' = User activity	Yes
	'05' = Idle screen available	Yes
	'06' = Card reader status	Not Applicable
	'07' = Language selection	Yes
	'08' = Browser termination	Yes
	'09' = Data available	Yes
	'0A' = Channel status	Yes
SET UP IDLE MODE TEXT		Yes, 1 row of text is supported
SET UP MENU		Yes
TIMER MANAGEMENT		Yes
OPEN CHANNEL		Yes
CLOSE CHANNEL		Yes
RECEIVE DATA		Yes



Service	Mode	Support
SEND DATA		Yes
GET CHANNEL STATUS		Yes

## User Interaction with SIM AT

### Display text

Text of up to 240 characters (120 UCS coded) is supported.

Text clearing times are 5-20 seconds with a 60-second time-out limit for the user to clear the text. 'Key' responses:

- 'End key' – Proactive session terminated by user.
- 'Back' – Backward move in proactive session.

MSK clears the screen if the command is performed successfully.

### Get inkey

Prompt for a one-character input. Pressing 'Ok' without entering a character gives warning message "Text too short". 'Key' responses:

- 'C' clears current character.
- 'End key' terminates the proactive session.
- 'Back' – Backward move in the proactive session.
- 'OK' – Command performed successfully.

### Get input

Prompt for character input. The phone will refuse to accept further input when maximum response length is exceeded. UI Maximum Response lengths:

- Digits Only – 160 characters.
- SMS default alphabet characters – 160 characters.
- Hidden Characters (digits only) – 20 characters.

'Key' responses:

- 'C' clears current character.
- 'End key' terminates the proactive session.
- 'Back' – Backward move in proactive session.
- 'OK' – Command performed successfully.

### Select item

Scroll to highlight item for selection. 'Key' responses:

- Navigational key press down – Scroll down list.
- Navigational key press up – Scroll up list.
- End key terminates proactive session.
- 'Back' – Backward move in proactive session.
- 'OK' – Command performed successfully.

### Send short message

Alpha Identifier text is displayed, if it is present. Otherwise, there is no user indication if the customization for default text is not enabled. If the customization for default text is enabled, and there is no Alpha Identifier, default message "Sending message" is displayed. Default responses are "Message failed" or "Message sent" for the customization enabled case with no Alpha Identifier.

'Key' responses:

- End key or 'Back' ends the proactive session.

### Set up call

If you are on a call when the commands 'Set up Call', 'Putting all other calls on hold' are sent, the user will see the "Let SIM card setup call" user confirmation text. If 'OK' is pressed the current call will be put on hold and the new call set up. If the phone is on a call when the command 'Set Up Call, disconnecting all other calls' is sent, the user will see the 'Let SIM card setup call' user information text. If the 'OK' key is pressed the current call will be disconnected and the new call set up.

### Set up menu

Incorporates a SIM Application Toolkit Menu Item into the ME's main menu structure.

If an Alpha Identifier is supplied in the Set Up Menu command, this is used as the SIM AT entry in the ME's main menu. If null alpha identifier is supplied

and several items are found in the menu, the default title “ONLINE SERVICES” is used. If the SIM AT Menu Item is selected by pressing ‘Select’,

all the items sent in the Set Up Menu command will be available for selection, in the same way as the Select Item command.

# Entertainment

## Audio and Video

File types	Formats	Extensions
Audio (All listed audio file formats are supported ringtone file formats)	3GP AAC MP4 M4A MP3 AMR AMR-WB WAV SMF (Standard MIDI File format) iMelody XMF (Mobile XMF supported) WMA	.3gp .aac .mp4 .m4a .mp3 .amr .awb .wav .mid .imy .xmf, .mxmf .wma
Video (including audio part)	MP4 (Video: MPEG4 or H.264, Audio: AAC or AAC+ or eAAC+) 3GPP™ (Video: MPEG4, H.263 or H.264, Audio: AMR-NB, AMR-WB, AMR-WB+, AAC, AAC+ or eAAC+) WMV	.mp4 .3gp .wmv, .asf
Streaming transport	RTSP according to 3GPP™	
Video encoding	H.263 Profile 0, Level 10 MPEG-4 Visual Simple Profile Level 3	
Audio encoding	AMR-NB AAC (for video recording only)	

File types	Decoder format	Supported in file format
Video decoding	MPEG-4 Visual Simple Profile H.264 Baseline Profile H.263 Profile 0 VC-1 (WMV9)	3GP/MP4 3GP/MP4 3GP WMV
Audio decoding	MPEG-1/2/2.5, audio layer 3 AAC AAC+ eAAC+ AMR-NB AMR-WB AMR-WB+ WMA version 2, 7, 8: Class 1 WMA version 9: Level 3 WMA Pro (profile M0a) General MIDI (GM) GML SP-MIDI DLS (Mobile DLS supported) Linear/A-law/ $\mu$ -law PCM	MP3 3GP/AAC/MP4/M4A 3GP/AAC/MP4/M4A 3GP/AAC/MP4/M4A 3GP/AMR 3GP/AMR/AMR-WB 3GP WMA WMA WMA SMF SMF SMF, XMF XMF WAV

## Java™

Feature	Functionalities
<b>Java™ Platform, Micro Edition</b>	<ul style="list-style-type: none"> <li>• JSR-75 PDA Optional Packages for J2ME™</li> <li>• JSR-82 Bluetooth Wireless Technology API</li> <li>• JSR 118 MIDP 2.0</li> <li>• JSR-120 Wireless Messaging API</li> <li>• JSR-205 Wireless Messaging API 2.0</li> <li>• JSR-135 Mobile Media API 1.1</li> <li>• JSR 139 CLDC 1.1</li> <li>• JSR-172 J2ME™ Web Services Specification</li> <li>• JSR-177 Security and Trust Services API for J2ME™</li> <li>• JSR-179 Location API (built-in GPS)</li> <li>• JSR-180 SIP API for J2ME™</li> <li>• JSR-184 Mobile 3D Graphics API for J2ME™</li> <li>• JSR 185 Java™ Technology for the Wireless Industry</li> <li>• JSR-211 Content Handler API</li> <li>• JSR-226 SVG API for J2ME™</li> <li>• JSR-229 Payment API</li> <li>• JSR-234 Advanced Multimedia Supplements</li> <li>• JSR-238 Mobile Internationalization API</li> <li>• JSR-239 OpenGL ES</li> <li>• JSR-248 Mobile Services Architecture</li> <li>• JSR-256 Mobile Sensor API (accelerometer)</li> <li>• Nokia UI Extension API</li> </ul>
<b>Java 3D</b>	<ul style="list-style-type: none"> <li>• Mascot Capsule Micro3D Version 3</li> <li>• JSR-239 OpenGL ES</li> <li>• JSR-184 Mobile 3D Graphics API for J2ME™</li> </ul>

# Imaging/Messaging

## 3.2 megapixel camera

<b>Digital still camera (DSC)</b>	
True colour	Yes
Digital zoom	Main camera: 3.2x zoom
Photo fix	Improves an under-exposed photo by calculating and adjusting the light balance
Still camera settings bar	
Shoot modes	Normal, Burst, Panorama, Frames
Photo sizes (resolution)	<b>3.2 MP</b> (2048x1536 pixels) <b>2 MP</b> (1632x1224 pixels) <b>1 MP</b> (1280x960 pixels) <b>VGA</b> (640x480 pixels) Note: MP = megapixel
Night mode	On, Off
Light	On, Off
Self-timer	Off, On
Effects	Off, Black & white, Negative, Sepia
White balance	Auto, Daylight, Cloudy, Fluorescent, Incandescent
Still camera setup	
Picture quality	Normal, Fine
Shutter sounds	Yes
Auto rotate	Off, On
Reset counter	Yes
Review	On, Off
Add position	On, Off
Reset settings	Yes
Save to memory	Memory card, phone memory
<b>Video recorder</b>	
Video size (resolution)	QVGA 320x240 pixels
Frame rate	15 fps (frames per second)
Digital zoom	3.2x

Video camera settings bar	
Video clip length	Normal, For picture message
Light	Off, On
Night mode	Off, On
Self-timer	Yes, same as camera
Effects	Yes, same as camera
White balance	Yes, same as camera
Microphone	Off, On
Video camera setup	
Reset counter	Yes, same as camera
Save to memory	Yes, same as camera
Review	On, Off
Reset settings	Yes

## Video telephony

Photo sizes (resolution)	QCIF (176x144 pixels) SQCIF (128x96 pixels)
Digital zoom	2.0x zoom
Night mode	On, Off
White balance	Auto
Brightness	Yes
Video coding	H.263 MPEG-4 Visual Simple Profile Level 0
Audio coding	AMR

## Images

Images can be shared using a Bluetooth wireless technology connection, MMS, email message, computer file transfer or memory card.

The image size is limited by the amount of free RAM.

Formats	Details
JPEG	<ul style="list-style-type: none"> <li>• ISO/IEC JPEG</li> <li>• Baseline DCT</li> <li>• Progressive DCT</li> <li>• Non-differential</li> <li>• Unlimited size</li> </ul>
GIF	<ul style="list-style-type: none"> <li>• 87a, 89a, support for interlacement, animation and transparency</li> <li>• Unlimited size</li> </ul>
BMP	Windows® bitmap format
PNG	Unlimited size
SVG	SVG Tiny 1.2
WBMP	<ul style="list-style-type: none"> <li>• Wireless bitmap</li> <li>• Unlimited size</li> </ul>

## Supported character set

Decoding text (Incoming MMS)	
US-ASCII	UTF-16
ISO-8859-1	KOI8-R
ISO-8859-2	GB2312
Windows-1251	GB 18030
ISO 10646 (UCS-2)	GB 13000
UTF-7	BIG-5
UTF-8	
Coding Text (Outgoing MMS)	
UTF-8	

## Short Messaging Service

Feature	Support
SMS Service Centre Number	It is possible to pre-load the SMS Service Centre Number
Pictures	It is possible to insert a picture or an icon into the text message. EMS compliant mobile phones will be able to see the picture correctly
Reply to messages	It is possible to reply to received messages by SMS, MMS, voice message and email
Input methods:	Predictive writing and multitap

Feature	Support
Copy and paste words	Yes
Teaching of predictive words that are not in the predictive dictionary	Yes
Options when creating a message:	
Save a sent message in a "Sent items" folder	Yes
Insert a line in the message	Yes
Assign a validity period to the message	Yes
Use predefined messages	Yes
Options when receiving a message:	
Reply to the sender	Yes
Forward the message	Yes
Save the message on the SIM card	Yes
Get delivery time and date	Yes
Options with the previously sent message:	
Delivery report of the message	Yes (if requested when sending)
Forward the message	Yes
Save the message on the SIM card	Yes
Know the remaining capacity storage	Yes, > 95% full warning, capacity on SIM when saving to SIM
Options with the previously received message:	
Reply to the sender	Yes
Save the message in the inbox	Yes
Forward the message	Yes
Know the remaining capacity storage	Yes, > 95% full warning, capacity on SIM when saving to SIM
Supported ways for replying to a received SMS:	
Via SMS, MMS, voice message, email	Yes
Via phone call (set up a call to the number contained in the message body)	Yes
Via Web browser (go to the Web address contained in the message body)	Yes
Via USSD session	No

Feature	Support
Print via infrared	No
Possibility to enable the user to send a text message to a list of recipients	Yes
Possibility to write an email address as a recipient address	Yes, if email gateway is present
SMS storage	In the phone memory, on the SIM card, or on memory card
Capacity	Up to 1,000 messages
Nokia Picture Messaging	Yes

## Enhanced Messaging Service

Feature	Support
Level of compliance supported by the phone regarding the specifications described in release 99	Enhanced Messaging Service (EMS) according to the standard 3GPP™ TS 23.040 v4.3.0, with the addition of the ODI feature from 3GPP™ TS 23.040 v5.0.0
Number of messages that the phone is able to handle to generate a concatenated message	10
Outgoing messages	It is possible to: <ul style="list-style-type: none"> <li>• See how many short messages an EMS message consists of before sending it.</li> <li>• Choose whether to send the message or not after writing it.</li> </ul>
Incoming messages	<ul style="list-style-type: none"> <li>• A signal is heard once all parts of the message have been received or when a time-out occurs.</li> <li>• It is possible to re-use the content of an EMS message. Sounds, pictures, and animations can be inserted in a new message, if the object is not protected using ODI.</li> </ul>
Delivery report for concatenated messages	A receipt is received in the phone when all parts of a concatenated message have been delivered if a delivery report is requested when it is being sent
Insert objects	It is possible to add pictures, animations and sounds to an EMS message
Sounds	Chimes high, chimes low, ding, tada, notify, drum, claps, fanfare, chords high, chords low
I-melody	Yes, version 1.2



Feature	Support
Melodies	It is possible to: <ul style="list-style-type: none"> <li>• Receive (always), send using EMS (if not copyright protected).</li> <li>• Download melodies and commercial tunes from the Web.</li> </ul>
WBMP	Yes
Picture sizes	16x16, 32x32 pixels, variable size in black and white
Pictures	It is possible to: <ul style="list-style-type: none"> <li>• Edit pictures using PhotoDJ™.</li> <li>• Receive (always), send using EMS (if not copyright protected).</li> <li>• Download pictures from the Web.</li> </ul>
Animations	There is support for the following animations: Angry, Crying, Flirty, Happy, Kiss, Sad, Tongue, Wow, Confused, Devil, Glasses, Indifferent, Laughter, Sceptical and Wink, as defined in 3GPP™ TS 23.040 v4.3.0. It is possible to send and receive animations
TP-PID field value given by the phone before sending an EMS message	0x00
EMS storage capacity	Up to 1,000 messages

## Multimedia Messaging Service

Feature	Support
MMS/CSD parameters and MMS/GPRS parameters placement	<ul style="list-style-type: none"> <li>• MMS is bound to an MMS profile.</li> <li>• A MMS profile is bound to a Data account.</li> <li>• A data account contains either CSD parameters or GPRS parameters and possibly proxy settings</li> </ul>
Possibility to pre-configure the MMS parameters in the factory	<ul style="list-style-type: none"> <li>• MMS/CSD: Yes</li> <li>• MMS/GPRS: Yes</li> </ul>
Possibility to configure the MMS parameters by OTA provisioning	<ul style="list-style-type: none"> <li>• MMS/CSD: Yes</li> <li>• MMS/GPRS: Yes</li> </ul>
Possibility for all the parameters from the parameters set to be OTA provisioned at the same time	<ul style="list-style-type: none"> <li>• MMS/CSD: Yes</li> <li>• MMS/GPRS: Yes</li> </ul>
Possibility for only one parameter, in the set of parameters, to be OTA provisioned	<ul style="list-style-type: none"> <li>• MMS/CSD: No</li> <li>• MMS/GPRS: No</li> </ul>
Supplier indication of realized interoperability tests between its MMS User Agent and MMS Relay/Server from other suppliers	Yes

Feature	Support
Support of a standard procedure for OTA provisioning of MMS parameters	OMA Client Provisioning 1.1
Functionalities that the user is able to set during message composition:	<ul style="list-style-type: none"> <li>• Message subject</li> <li>• Message priority</li> <li>• Email recipient address</li> <li>• Message Cc, Bcc recipient(s) address(es)</li> <li>• Delivery report request</li> <li>• MSISDN recipient address</li> <li>• Validity period</li> </ul>
From where can the user insert multimedia elements into multimedia messages:	File Manager Photo album Camera Contacts Calendar Task Note Browser (vBookmark) VideoDJ™ PhotoDJ™ MusicDJ™ Sound recorder
Possibility for sent messages to be memorised into a folder in phone memory	Yes
Actions that the user can perform after message retrieval:	<ul style="list-style-type: none"> <li>• Reply to the sender of the message SMS/MMS</li> <li>• Reply to the sender and to Cc, Bcc people SMS/MMS</li> <li>• Forward the message</li> <li>• Delete the message</li> <li>• Save message in a dedicated folder</li> <li>• Call the sender of a message</li> <li>• Save item</li> <li>• Mark as unread</li> <li>• Details</li> </ul>
Multimedia codecs/formats supported for audio	AAC, AMR, MPEG Layer 3, AWB, WAV, MP4, MIDI, iMelody, 3GPP™, XMF, M4A, WMA
Multimedia codecs/formats supported for video	MPG4, 3GPP™, SDP, WMV
Multimedia codecs/formats supported for image	JPEG, GIF87, GIF89A, PNG, SVG, WBMP, BMP
Supported formats for message presentation:	<ul style="list-style-type: none"> <li>• Message body plus attachments (email presentation)</li> <li>• SMIL version as described in OMA MMS IOP document version 1.2</li> </ul>
Maximum message size that can be handled by the phone	Content Class and Creation mode are applied. Maximum size can also be customised
Maximum number of objects supported in a message	30 objects is standard. It is possible to increase the number through configuration

Feature	Support
Maximum text size	5,000 characters/text
Storage capacity	Up to 500 messages

## Email client technical data

Feature	Support
Bearer type (IP)	Yes
Bearer type GSM Data (IP)	Yes, GPRS and HSCSD
Character sets	<ul style="list-style-type: none"> <li>• ISO: ISO-8859-1, ISO-8859-2, ISO-8859-5, ISO-8859-7, ISO-8859-9, ISO-8859-10, ISO-8859-11</li> <li>• Windows: Windows-1251, Windows-1252, Windows-1254, Windows-1255, Windows-1258</li> <li>• US-ASCII</li> <li>• Unicode: UTF-7, UTF-8, UTF-16</li> <li>• Japanese: Shift_JIS, ISO-2022-JP</li> <li>• Cyrillic: KOI8-R</li> <li>• Simplified Chinese: GB2312, GB18030</li> <li>• Traditional Chinese: Big5</li> </ul>
OTA provisioning solution	OMA Client Provisioning 1.1
Protocols	POP3 and IMAP4
Push email	IMAP IDLE (extension of IMAP4 Rev1), OMA Email Notification 1.0 and scheduled checking, Exchange ActiveSync® (EAS)
Secure email	SSL/TLS, both port methods (POPS/IMAPS) and STARTTLS
HTML mail	Yes (tags removed)
Thumbnailed image attachments	Yes
Message management	User selectable inbox size, save messages to Memory Stick, arrange messages by date, size and Email address
ESMTP	Yes
Background sending	Yes

## Connectivity

# A-GPS

## A-GPS technical data

Feature/Dimension	Support
Standards	Control plane (3GPP™) and user plane (OMA SUPL v1.0) assistance. The GPS receiver can be used in autonomous mode without any assistance data.
OMA SUPL v1.0	<ul style="list-style-type: none"> <li>The SLP address can be configured using OMA Client Provisioning v1.1.</li> <li>Secure data connection for assistance data delivery.</li> </ul>
Performance	Varies depending on geographic location and network operator support.

## Bluetooth™ wireless technology technical data

Dimension	Support
Bluetooth™ wireless technology capability statement	This phone supports Bluetooth Specification, version 2.0 with enhanced data rate (EDR)
Bluetooth™ wireless technology profiles	Advanced Audio Distribution Profile Audio/Video Remote Control Profile Basic Imaging Profile Dial-up Networking Profile File Transfer Profile Generic Access Profile Generic Object Exchange Profile Handsfree Profile Headset Profile Human Interface Device Profile Object Push Profile Personal Area Networking Profile Phonebook Access Profile Serial Port Profile Synchronization Profile SyncML OBEX binding
Connectable devices	All products supporting Bluetooth spec. 1.1, or higher, and at least one of the profiles above
Coverage area	Varies due to radio performance between the connected devices and the occurrence of obstacles. Up to 10 metres (33 feet)
Transmission power	Class 1, typical +2 dBm or 2 mW

<b>Dimension</b>	<b>Support</b>
Frequency band	2.4 GHz – the unlicensed ISM band
Power consumption	GSM host processor excluded: <ul style="list-style-type: none"> <li>• Standby, Bluetooth On mode: &lt;0.6 mA</li> <li>• Voice to headset (HV3 master): 11 mA (7 mA with EDR functionality, 2EV3 master). Dependent on various parameters such as if the phone is master or slave</li> <li>• Data mode average: 25mA at 172.9 Kbps symmetrical (DH1)</li> </ul>
Data transmission rate	<ul style="list-style-type: none"> <li>• Data speed at least 800 Kbps on a Dial-up Networking connection (requires access to HSPA network and may be limited by capacity situation on the 3G base station)</li> <li>• Data speed typically 1.0 Mbps on an Object Push connection between two phones (in case of using similar phones and if no other Bluetooth devices are connected)</li> </ul>

## WLAN technical data **NOTE: Not available in China market**

<b>Dimension</b>	<b>Support</b>
Supported standards	Wi-Fi™ certified. The mobile phone can access the Internet using a Wireless Local Area Network instead of GPRS or 3G. When applicable, 802.11g is prioritized over 802.11b
Connectable devices	Wi-Fi™ access points
Frequency band	2.4 GHz
Data transmission rate	5 MBit/s
Security	Open Open WEP Shared WEP WPA Personal and WPA2 Personal WPA Enterprise and WPA2 Enterprise
Encryption	TKIP and AES
Power save	WMM-UAPSD
QoS	WMM

## OMA Data Synchronization (SyncML™) technical data

Feature	Support for Sync ML
SyncML compliance	The phone is fully SyncML compliant, having passed SyncML Conformance testing. OMA DS 1.2 or OMA DS 1.1.2 is used depending on configuration and both are supported in Server-alerted synchronization
Basic data formats	Contacts: vCard 2.1, Calendar: vCalendar 1.0 (vEvent) Tasks: vCalendar 1.0 (vTodo) Notes: text/plain, Bookmarks:vBookmark 1.0
Possibility for operators to extend SyncML functionality	The device may be configured to include preset SyncML settings, and to control whether SyncML 1.1 or SyncML 1.2 will be used
Transport method for SyncML messages	HTTP, HTTPS, OBEX (USB, Bluetooth)
Possibility for the user to configure login parameters (for example, username and password) to access the remote database	Yes
Configuration parameters that can be entered/modified by the user	Server URL, Username, User PWD, Paths to databases (Calendar, Contacts, Notes, Tasks and Bookmarks), UserID and PWD for databases, Databases to be synchronised (On/Off), Internet profile, Synchronization interval, Server ID and Server PWD, permission to allow server-alerted synchronization and roaming options. Can be provisioned with OMA Client provisioning v1.1 and OMA Device Management v1.2
Ability to deal with multiple servers	Yes
Ability to perform conflict resolution actions	Yes

## Microsoft® Exchange ActiveSync®

Feature	Support for Exchange ActiveSync
Protocol version	The phone supports version 2.5 of Microsoft Exchange ActiveSync
Supported applications	Email, Calendar, Phonebook
Transport method used	HTTP, HTTPS
Possibility for the user to configure login parameters for remote server	Yes

Feature	Support for Exchange ActiveSync
Configuration parameters that can be entered/modified by the user	Server URL, username, domain name, password, applications to sync, email message size, email attachment size, email date range, message alert sound, calendar date range, interval sync, secure connection, roaming option
Ability to perform conflict resolution	No

## Web browser technical data

Feature	Support in the browser
Bookmarks	Yes, with folders and sorting supported
Bookmark Export/Import	Yes, can be sent and received using vBookmark format using Bluetooth™ wireless technology, SMS, MMS and email
Browser compliancy	<p>The Web browser is compliant with the following standards:</p> <p>HTML ver. 4.01</p> <p>XHTML™ Basic 1.0</p> <p>XHTML™ 1.1, Module-based XHTML™</p> <p>XHTML™ Mobile profile</p> <p>WML 1.3</p> <p>Cascading Style Sheets, level 2 revision 1, CSS 2.1 Specification</p> <p>Wireless CSS Specification, Version 26-Oct-2001 (WAP-239-WCSS-20011026-a)</p> <p>ECMA-script according to specifications found at <a href="http://www.ecma-international.org/publications/standards/Stnindex.htm">http://www.ecma-international.org/publications/standards/Stnindex.htm</a></p> <p>ECMAScript Mobile Profile</p> <p>AJAX</p> <p>Document Object Model Level 2 (DOM 2)</p> <p>Scalable Vector Graphics, Mobile SVG Profile: SVG Tiny, version 1.2</p> <p>For further details, see the <i>WAP User Agent strings and profiles for Sony Ericsson mobile phones</i> Developers guidelines at Developer World <a href="http://developer.sonyericsson.com/">http://developer.sonyericsson.com/</a></p>
Browser version	Access NetFront™ 3.4
Cache	Yes (size 2 MB)
Character sets *	<p>Most standard character sets, among others UTF-8 (Default), UTF-16, USASCII, Latin1, UCS2.</p> <p>For updated and detailed information, see the <i>WAP User Agent strings and profiles for Sony Ericsson mobile phones</i> Developers guidelines at Developer World <a href="http://developer.sonyericsson.com/">http://developer.sonyericsson.com/</a></p> <p>* When creating pages, it is recommended to always save the page contents as UTF-8.</p>
Clear cache	Yes, persistent. By user interaction, at SIM card change or master reset
Frames	Full Frame support: Frames, IFrames

Feature	Support in the browser
Image formats and animations	GIF (interlaced and non-interlaced) WBMP, JPEG, PNG, BMP and SVG. Animated GIFs, animated SVG and Flash
Schemes	Http:, https:, rtsp:, mailto:, smsto:, mmsto:, tel:, wtai:
Streaming	Progressive download, RTSP, Java script controls
Web feeds	Ticker, podcasts, enclosures, OPML import. No support for ATOM
<b>User agent profile</b>	
User Agent Profiles	Yes, list of client characteristics - for example, screen size. For details, see the <i>WAP User Agent strings and profiles for Sony Ericsson mobile phones</i> Developers guidelines at Developer World <a href="http://developer.sonyericsson.com/">http://developer.sonyericsson.com/</a>
URL sent pointing to the UA profile at the beginning of browser session	Yes. For details, see the <i>WAP User Agent strings and profiles for Sony Ericsson mobile phones</i> Developers guidelines at Developer World <a href="http://developer.sonyericsson.com/">http://developer.sonyericsson.com/</a>
<b>Download</b>	
OMA download functionality	Yes
HTTP GET solution to download content/ Uses browser for download	Yes
Other download content	Yes. No download limit when using HTTP protocol
Download application/product memory check	Yes
Downloaded object solution	Yes. The user is informed where the content is saved and asked if it should be used at once or later
UAP indication for downloading	Yes
Other features	Yes. Save, delete, forward, use, manage
Object formats	All formats can be downloaded and saved, but only formats supported by the phone can be used by the phone
Resume	Yes
Background download	Yes
Progressive download	Yes
Streaming	Yes
<b>Browser navigation</b>	
Selection keys	Yes. Two selection keys and centre navigation key
Search from standby	Yes. Enter address, search the web or bookmarks.
Separate/dedicated back or erase keys	Yes



Feature	Support in the browser
Display backlight on when browsing	Yes
Predictive writing	Yes
“http://” string displayed automatically when entering URLs	Not displayed but the “http://” is added automatically to the URL
“www” added automatically when entering URLs	Yes
Combined Search/Go To input field	Intelligent input field changes appearance (Search or Go to) depending on user input. “www”, “.com” and other URL syntax can be used to trigger the Go To appearance
<b>Internet network features</b>	
Bluetooth™ wireless technology (as local connection)	Yes
Infrared (as local connection)	No
Network settings	Yes
PPP Authentication	PAP, CHAP supported
Security	HTTPS authentication TLS version 1 SSL version 3 WIM on SIM ICC X.509 certificate support, Mobile Profile WPKI OTA download of trusted certificates
USB (as local connection)	Yes
<b>PUSH</b>	
<b>Content types</b>	
Service Indication (SI)	Yes
Service Loading (SL)	Yes
Cache Operation (CO) content type	No
Session Initiation Application (SIA)	Yes
<b>Man Machine Interface</b>	
SI/content retrieval postponing	Yes
SI menu structure accessibility	Messaging, Inbox
SL reception warning	The user can make a choice if a dialogue is wanted or not before loading the SL

Feature	Support in the browser
SIA reception warning	Yes
Cache size limitations	The oldest push in the inbox will be discarded
Number of push messages	Depends on the size of the push messages. Around 20 push messages with a size of 1024 bytes URL and 1024 bytes Indications for Service Indication can be saved.
Push deactivate	Yes
Dynamic push menu changes	No. There are no changes in the menus when activating/deactivating push
<b>Security</b>	
Mechanisms for push	None
Trust with PPG	Sending a SIA is the most reliable
WSP push sessions	No
HTTP push sessions	The White List (a setting to allow push messages only from certain addresses) is supported for IP address
SMS connection-less push	The White List (a setting to allow push messages only from certain addresses) is supported for SMS Center
Denial of service/spoofing	Setting to select when to allow push messages: Always, always ask or never. There is also a setting to select whether to allow push messages from all senders or only from certain addresses (the White List)

## Client Provisioning

Feature	Support
<b>Provisioning types</b>	<b>OMA Client Provisioning (v1.1)</b>
Total Parameter sets	25 (shared between the provisioning types) < or = 25 (total number of data accounts)
Parameter set list	See the <i>Device Management v4</i> Developers Guideline at Developer World <a href="http://www.sonyericsson.com">http://www.sonyericsson.com</a>
Factory pre-configuration	Yes. This also provides the possibility to lock a setting
<b>Security mechanism</b>	
<b>Bearer</b>	

Feature	Support
SMS	Uses security mechanism (SEC) methods according to OMA-WAP-ProvCont-v1_1-20050428-C (see <a href="http://www.openmobilealliance.org">www.openmobilealliance.org</a> ). For NETWPIN the user is asked to accept to install received settings. For USERPIN, USERNETWPIN and USERPINMAC the user is subsequently asked to enter a PIN code that is a shared secret between the service provider and the user
Carrier reset/provisioning	Yes, but not if the set is pre-configured in the factory and locked
SWIM	Not used for provisioning. The SWIM is only used for wireless security, both SSL/TLS connections and digital signatures
<b>Applicative provisioning</b>	
Preferred bearer customization	Yes
Other applications/features	Yes (MMS, Email, OMA Data Synchronization, Wireless Village, OMA Device Management, Streaming)
<b>Technologies</b>	
OMA Client Provisioning	Yes, Client Provisioning version 1.1
Nokia/Ericsson OTA	No
Openwave OTA	No
Other	No
Provisioning bearer	SMS

# Abbreviations

## **3GPP™**

3rd Generation Partnership Project

## **AAC**

Advanced Audio Coding

## **AAC+**

High Efficiency AAC v.1

## **AJAX**

Asynchronous JavaScript and XML

## **AMR**

Adaptive Multi Rate. Audio format for speech sounds

## **AMR-NB**

Adaptive Multi Rate Narrow Band

## **AMR-WB**

Adaptive Multi Rate Wide Band, a more efficient codec that supports speech with higher quality

## **API**

Application Programming Interface

## **Bluetooth PAN**

Bluetooth Personal Area Network

## **CS**

Circuit Switched

## **CSD**

Circuit Switched Data

## **DLNA™**

Digital Living Network Alliance

## **DRM**

Digital Rights Management. Controlling copying and distribution of contents, with respect to intellectual property rights

## **DTMF or Touch Tone**

Dual Tone Multi-Frequency signal. Codes sent as tone signals. Used for telephone banking, accessing an answering machine, etc.

## **EDGE**

Enhanced Data Rates for GSM Evolution

## **e-GSM**

Extended GSM. New frequencies specified by the European Radio Communications Committee (ERC) for GSM use when additional spectrum is needed (network-dependent). It allows operators to transmit and receive just outside GSM's core 900 frequency band. This extension provides increased network capability

## **eAAC+**

High Efficiency AAC v.2

## **EDR**

Enhanced Data Rate

## **EFR**

Enhanced Full Rate, speech coding

## **EMS**

Enhanced Messaging Service. Allows the user to add simple pixel pictures and animations, sounds and melodies to a text message. The EMS 3GPP™ standard also includes text formatting

## **ETSI**

European Telecommunications Standards Institute

**FM**

Frequency Modulation of the (radio) carrier wave

**FR**

Full Rate, speech coding.

**GIF**

Graphics Interchange Format

**GPRS**

General Packet Radio Services

**GSM**

Global System for Mobile Communications. GSM is the world's most widely used digital mobile phone system, now operating in over 100 countries around the world, particularly in Europe and Asia-Pacific.

The GSM system family includes GSM 850, GSM 900, GSM 1800 and GSM 1900. There are different phases of roll-out for the GSM system and GSM phones are either phase 1 or phase 2 compliant

**HR**

Half Rate, speech coding

**HSCSD**

High Speed Circuit Switched Data

**HSDPA**

High Speed Downlink Packet Access

**HSPA**

High Speed Packet Access

**HSUPA**

High Speed Uplink Packet Access

**HTML**

HyperText Markup Language

**HTTP**

HyperText Transfer Protocol

**IrDA**

Infrared Data Association

**JPEG**

Joint Photographer Expert Group

**MIDI**

Musical Instrument Digital Interface

**ME**

Mobile Equipment

**MP**

Megapixel

**MP3**

Short for "MPEG-1 layer 3", an audio coding scheme

**MPEG4/MPG4**

Moving Picture Experts Group. MPEG-4 is a standard used primarily to compress audio and visual digital data.

**MT**

Mobile Termination

**ODI**

Object Distribution Indicator

**OMA**

Open Mobile Alliance

**OTA**

Over The Air

**PDA**

Personal Digital Assistant

**PDP**

Packet Data Protocol

**PIM**

Personal Information Management

**PNG**

Portable Network Graphic

**QCIF**

Quarter Common Intermediate Format

**RDS**

Radio Data System

**RSS**

Really Simple Syndication

**RTSP**

Real Time Streaming Protocol session control.

**SI**

Service Indication

**SL**

Service Loading

**SIM card**

Subscriber Identity Module card – a card that must be inserted in any GSM-based mobile phone. It contains subscriber details, security information and memory for a personal directory of numbers. The card can be a small plug-in type or credit card-sized, but both types have the same functions. The phone uses the small plug-in card.

**SMS**

Short Messaging Service. Allows messages of up to 160 characters to be sent and received via the network operator's message centre to a mobile phone

**SP-MIDI**

Scalable Polyphony MIDI

**SS**

Supplementary Services

**SSL**

Secure Socket Layer

**TLS**

Transport Layer Security

**TTI**

Transmission Time Interval

**UI**

User Interface

**UMTS**

Universal Mobile Telecommunications System

**URL**

Uniform Resource Locator.  
The global address of documents and other resources on the World Wide Web

**USSD**

Unstructured Supplementary Services Data

**vCard**

vCard automates the exchange of personal information typically found on a traditional business card, for use in applications such as Internet mail, voicemail, Web browsers, telephony applications, call centres, conferences, PIMs /PDAs, pagers, fax, office equipment and smart cards. vCard is specified by IETF

**VGA**

Video Graphics Array

**WAV**

Waveform audio format

## **WMA**

Windows Media Audio

## **WMA Pro**

Windows Media Audio Professional

## **WBMP**

Wireless BitMap.

A graphic format optimised for mobile computing devices

## **WCDMA**

Wideband Code Division Multiple Access

## **WML**

Wireless Markup Language. A markup language used for authoring services, fulfilling the same purpose as HyperText Markup Language (HTML) does on the World Wide Web (WWW). In contrast to HTML, WML is designed to fit small handheld devices

## **WPA**

Wi-Fi Protected Access

## **WPA**

Wi-Fi Protected Access

## **WWW**

World Wide Web

## **XHTML**

Extensible HyperText Markup Language

## **XML**

Extensible Markup Language

# Related information

## Documents

---

- Sony Ericsson User guide
- Sony Ericsson FAQ
- AT Command Reference Manual
- WAP 2.0 Specifications

## Links

---

- [www.sonyericsson.com/](http://www.sonyericsson.com/)
- [www.ericsson.com/mobilityworld/](http://www.ericsson.com/mobilityworld/)
- [www.midi.org](http://www.midi.org)
- [www.extendedsystems.com](http://www.extendedsystems.com)
- [www.gsmworld.com/](http://www.gsmworld.com/)
- [www.bluetooth.com](http://www.bluetooth.com)
- [www.imc.org](http://www.imc.org)
- [www.3gpp.org](http://www.3gpp.org)
- [www.irda.org](http://www.irda.org)
- [www.etsi.fr](http://www.etsi.fr)
- [www.openmobilealliance.org](http://www.openmobilealliance.org)
- [www.imc.org/pdi/](http://www.imc.org/pdi/)
- [www.w3.org/TR/xhtml1-basic/](http://www.w3.org/TR/xhtml1-basic/)
- [www.java.sun.com](http://www.java.sun.com)
- [www.memorystick.org/](http://www.memorystick.org/)
- [www.memorystick.com/](http://www.memorystick.com/)
- [www.sonyericsson.com/updateservice](http://www.sonyericsson.com/updateservice)
- [www.sonyericsson.com/support](http://www.sonyericsson.com/support)

## Trademarks and acknowledgements

---

The Bluetooth™ word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by Sony Ericsson is under licence.

The Liquid Identity logo, PlayNow, BestPic, SensMe, VideoDJ, MusicDJ, TrackID and PhotoDJ are trademarks or registered trademarks of Sony Ericsson Mobile Communications AB.

WALKMAN, Memory Stick Micro, M2, and Sony are trademarks or registered trademarks of Sony Corporation.

PLAYSTATION is a trademark or registered trademark of Sony Computer Entertainment, Inc.

NetFront is a trademark or a registered trademark of ACCESS Co., Ltd.

PictBridge is a trademark or registered trademark of Canon Kabushiki Kaisha Corporation.



Ericsson is a trademark of Telefonaktiebolaget LM Ericsson.

TrackID™ is powered by Gracenote Mobile MusicID™. Gracenote and Gracenote Mobile MusicID are trademarks or registered trademarks of Gracenote, Inc.

Google™ and Google Maps™ are trademarks or registered trademarks of Google, Inc.

Wi-Fi is a trademark or registered trademark of the Wi-Fi Alliance.

DLNA is a trademark or registered trademark of the Digital Living Network Alliance.

MicroSD™ and Transflash™ are trademarks or registered trademarks of SanDisk Corporation.

XHTML™ is a registered trademark of the W3C.

Microsoft®, Windows® Vista, Windows Media and ActiveSync are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Adobe Flash Lite are trademarks or registered trademarks of Adobe Systems Incorporated in the United States and/or other countries.

3GPP™ is a trademark of ETSI in France and other jurisdictions.

SyncML is a trademark or registered trademark of Open Mobile Alliance Ltd.

Wireless Village is a trademark or registered trademark of Open Alliance LTD.

Java and all Java based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries.

End-user license agreement for Sun Java™ J2ME™:

1. Restrictions: Software is confidential copyrighted information of Sun and title to all copies is retained by Sun and/or its licensors. Customer shall not modify, decompile, disassemble, decrypt, extract, or otherwise reverse engineer Software. Software may not be leased, assigned, or sub licensed, in whole or in part.

2. Export Regulations: Software including technical data, is subject to U.S. export control laws, including the U.S. Export Administration Act and its associated regulations, and may be subject to export or import regulations in other countries. Customer agrees to comply strictly with all such regulations and acknowledges that it has the responsibility to obtain licenses to export, re-export, or import Software. Software may not be downloaded, or otherwise exported or re-exported (i) into, or to a national or resident of, Cuba, Iraq, Iran, North Korea, Libya, Sudan, Syria (as such listing may be revised from time to time) or any country to which the U.S. has embargoed goods; or (ii) to anyone on the U.S. Treasury Department's list of Specially Designated Nations or the U.S. Commerce Department's Table of Denial Orders.

3. Restricted Rights: Use, duplication or disclosure by the United States government is subject to the restrictions as set forth in the Rights in Technical Data and Computer Software Clauses in DFARS 252.227-7013(c) (1) and FAR 52.227-19(c) (2) as applicable.

All other trademarks and copyrights are the property of their respective owners.